

Appendix A

Lewis Curriculum Vitae

## APPENDIX A

### CURRICULUM VITAE

NAME: Michael Edward Lewis, Ph.D.

BIRTHDATE: November 9, 1951

BIRTHPLACE: Chicago, IL

HOME ADDRESS: 1007 Saber Road  
West Chester, PA 19382

MARITAL STATUS: Married, two children

Wife Jill M. Roberts-Lewis, Ph.D.

EDUCATION:

B.A., 1973 The George Washington University (Psychology)  
Washington, D.C.

M.A., 1975 Clark University (Psychology)  
Worcester, MA

Thesis Title: The Influence of Early Experience on the  
Effects of One- and Two-Stage Hippocampal Lesions in  
Male Rats

Ph.D., 1977 Clark University (Psychology)  
Worcester, MA

Dissertation Title: Nerve Growth Factor and Recovery of  
Function after Brain Damage

POSITIONS HELD:

1972-1973 Psychology Technician, Section on Neuropsychology,  
Laboratory of Psychology, National Institute of Mental  
Health, Bethesda, MD

1973-1977 Graduate Student and Teaching Assistant, Clark  
University, Worcester, MA

1977 Guest Worker, Section on Growth Factors, National  
Institute of Child Health and Human Development, NIH,  
Bethesda, MD

1977-1978	Supervisor of Part II (advanced undergraduate) students, University of Cambridge, Cambridge, England
1977-1979	Research Fellow, The Physiological Laboratory, and The Psychological Laboratory, University of Cambridge, England
1979	Instructor, European Division, University College, University of Maryland, RAF Bentwaters, Suffolk, England
1980	Research Psychologist (GS-11), Section on Biochemistry and Pharmacology, Biological Psychiatry Branch, National Institute of Mental Health, Bethesda, MD
1980-1981	Research Psychologist (GS-12), Division of Research, National Institute on Drug Abuse, Rockville, MD
1981-1985	Research Investigator, Mental Health Research Institute, The University of Michigan, Ann Arbor, MI
1985-1987	Principal Scientist, Central Research and Development Department and Medical Products Department, E.I. du Pont de Nemours & Co., Experimental Station, Wilmington, DE
1986-1987	Visiting Associate Professor of Pharmacology, Department of Pharmacology, Medical College of Pennsylvania, Philadelphia, PA
1988-1989	Co-Founder and Senior Scientist, Cephalon, Inc., West Chester, PA (IPO 1991; CEPH: NASDAQ)
1989-1992	Director of Pharmacology, Cephalon, Inc., West Chester, PA
1992-1993	Senior Director of Scientific Affairs, Cephalon, Inc., West Chester, PA
1993-1994	Vice President of Research, Symphony Pharmaceuticals, Inc., Malvern, PA
1994-	President, BioDiligence Partners, Inc., West Chester, PA
1994-1997	Co-Founder and Chief Scientific Advisor, Adolor Corporation, Malvern, PA (IPO 2000; ADLR: NASDAQ)
1997-	Co-Founder and Chief Scientific Advisor, Arena Pharmaceuticals, Inc., San Diego, CA (IPO 2000; ARNA:NASDAQ)

## HONORS, AWARDS AND FELLOWSHIPS:

1973	Graduated from The George Washington University with Special Honors in Psychology
1974	Honorable Mention, National Science Foundation, Washington, D.C.
1977-1979	Felix and Elizabeth Brunner Award, Mental Health Foundation, London, England
1979	Wellcome Research Fellowship, The Wellcome Trust, London, England
1979	Twinning Grant (with Professor A. Bjorklund, University of Lund), European Training Program in Brain and Behavior Research, European Science Foundation, Strasbourg, France
1981-1982	John G. Searle Clinical Pharmacology Fellowship
1982-1985	National Research Service Award, USPHS
1989	Small Business Innovative Research Grant, Phase I, NIMH, MHSB 1 R43 MH44950-01A1, "Non-radioactive Detection of Receptors in Brain".
1990	Small Business Innovative Research Grant, Phase I, NIMH, MHSB 1 R43 MH44957-01A1, "Non-radioactive Hybridization of Brain RNA".
1992	Small Business Innovative Research Grant, Phase II, NIMH, MHSB 2 R44 MH44957-02, "Non-radioactive Hybridization of Brain RNA".

## PROFESSIONAL SOCIETY MEMBERSHIPS:

Division of Medicinal Chemistry, ACS  
Division of Organic Chemistry, ACS  
International Brain Research Organization  
Society for Neuroscience

JOURNAL REFEREE:

Biochemical Pharmacology  
Brain Research  
Endocrine Journal  
Endocrinology  
Experimental Neurology  
Journal of Neuroscience Methods  
Molecular and Cellular Neurosciences  
Neurochemistry International  
Neuroscience  
Peptides  
Proceedings of the National Academy of Sciences  
Science

GRANT AND CONTRACT REVIEWER:

National Institute on Drug Abuse  
National Institute of Mental Health  
National Science Foundation  
Veterans Administration Research Program

CONFERENCE ORGANIZING COMMITTEES:

Du Pont Workshop on Computer-aided Data Acquisition and Integration in Neuroanatomy, March 19-20, 1986.

International Conference on Chemically Induced Neurotoxicity: Concepts, Criteria, and Methods, Dampierre-en-Yvelines, France, July 1990.

MAJOR DRUG DISCOVERY/DEVELOPMENT ACTIVITIES (CEPHALON):

Myotrophin (IGF-I) Program

- o Supervised initial discovery research on IGF-I for motor neuron diseases
- o Lead inventor on issued U.S. and pending foreign patents for use of IGF-I in treating amyotrophic lateral sclerosis; co-wrote application
- o Initiated testing of IGF-I in peripheral neuropathy models with collaborators
- o Lead inventor on issued U.S. and pending foreign patents for use of IGF-I in treating peripheral neuropathy; co-wrote application
- o Contributed to writing of document to obtain orphan drug designation from FDA; filed in 1992, approved in 1992; created "Myotrophin" name for IGF-I
- o Contributed to writing of pre-IND document for FDA
- o Presented IGF-I efficacy data to FDA in pre-IND meeting
- o Contributed to writing IND; filed in 1992, approved in 1993
- o Participated in regular Myotrophin team meetings (clinical plans/strategy)

- o Responsible for presenting Myotrophin data at clinical neurology meetings

Receptor Tyrosine Kinase Effector Program

- o Supervised initial discovery research in receptor tyrosine kinase program
- o Lead inventor on issued U.S. and pending foreign patents for CEP-075 and CEP-1347; co-wrote application

Cerebral Ischemia Program

- o Supervised cerebral ischemia research program
- o Co-inventor on issued U.S. patent; co-wrote application

Neurotrophic Factor-Enhancing Molecule Program

- o Presented proposed program to Schering-Plough management prior to establishment of corporate relationship
- o Established and supervised research program
- o Presented program progress updates to Schering-Plough management
- o Co-inventor on pending patents; co-wrote application

Retinopathy Therapeutics Program

- o Co-inventor on pending patents; co-wrote application

Prostate Cancer Therapeutics/Diagnostics

- o Co-inventor on pending patents; co-wrote application

## MAJOR CORPORATE SUPPORT ACTIVITIES (CEPHALON):

- o Prepared application for NRC Radioactive Materials License; application approved in 1988
- o Assisted in writing technical section of Prospectus for Initial Public Offering
- o Responsible for road show presentations in Japan for Initial Public Offering (\$59.4 million)
- o Responsible for technical portion of road show presentations of Cephalon Clinical Partners, L.P. private placement (\$45 million)
- o Regularly met with brokerage analysts for due diligence
- o Created and managed the Scientific Affairs group, with responsibility for timely identification and analysis of new technologies which could enhance, complement, or compete with existing research programs

## MAJOR DRUG DISCOVERY/DEVELOPMENT ACTIVITIES (SYMPHONY):

- o Responsible for overall management of research programs
- o Participated in ACPC Development Meetings
- o Participated in ACPC pre-IND meeting with FDA
- o Researched and identified potential surrogate marker for Phase I
- o Researched and proposed initial Phase II indication for ACPC
- o Identified and contacted lead clinical investigator for Phase II

## MAJOR CORPORATE SUPPORT ACTIVITIES (SYMPHONY):

- o Supervised preparation of application for NRC Radioactive Materials License; application approved in 1994
- o Prepared Technology Summary Document for potential corporate partners
- o Responsible for presenting technical portion of slide show to potential investors
- o Responsible for providing technical due diligence information and position papers to potential investors

## MAJOR DRUG DISCOVERY/DEVELOPMENT ACTIVITIES (ADOLOR):

- o Co-inventor on ADL 2-1294 patent application; assisted in preparation
- o Participated in ADL 2-1294 Development Meetings
- o Researched and identified Phase Ib clinical surrogate indicator for ADL 2-1294
- o Researched and proposed initial Phase II indication for ADL 2-1294
- o Assisted in writing pre-IND document for ADL 2-1294

## MAJOR CORPORATE SUPPORT ACTIVITIES (ADOLOR):

- o Assisted in recruiting CEO and initial investors (\$1.5 million)
- o Primary responsibility for writing business plan
- o Assisted in presentation of company technology to potential follow-on investors
- o Responsible for providing technical due diligence information and position papers to follow-on investors (\$9.6 million, 1996; \$9.7 million, 1997)
- o Assisted in presentation of company technology to potential corporate partners

## CURRENT ACTIVITIES:

- o Co-Founder and Chief Scientific Advisor, Arena Pharmaceuticals (80% commitment)
- o Private consulting (20% commitment)



## BIOGRAPHY:

*Who's Who in Science and Engineering*, 1992-1993, p. 508

## BOOK EDITED:

*Brain Imaging: Techniques and Applications*, N.A. Sharif and M.E. Lewis, eds., Ellis Horwood Ltd., Chichester, England. 1989.

## ISSUED U.S. PATENTS:

Lewis, M.E., Kauer, J.C., Smith, K.R., Callison, K.V. and Baldino, F., Jr. Treating disorders by application of insulin-like growth factor. U.S. 5,093,317 (patent for Myotrophin - amyotrophic lateral sclerosis indication, for which two Phase III trials were completed; provisional FDA approval pending further development).

Lewis, M.E., Apfel, S.C. and Kessler, J.A. Prevention and treatment of peripheral neuropathy. U.S. 5,420,112 (patent for Myotrophin - chemotherapy-induced peripheral neuropathies).

Roberts-Lewis, J.M. and Lewis, M.E. Treatment of neurological disorders. U.S. 5,430,039 (patent for small molecule stroke therapeutic).

Lewis, M.E., Kauer, J.C., Neff, N., Roberts-Lewis, J., Murakata, C., Saito, H., Matsuda, Y. and Glicksman, M.A. Selected protein kinase inhibitors for the treatment of neurological disorders. U.S. 5,461,146 (patent for small molecule compounds in CEP-1347 class, expected to enter clinical development for Alzheimer's disease).

Lewis, M.E., Apfel, S.C. and Kessler, J.A. Prevention and treatment of peripheral neuropathy. U.S. 5,569,648 (patent for Myotrophin - toxic neuropathy indications).

Lewis, M.E., Kauer, J.C., Neff, N., Roberts-Lewis, J., Murakata, C., Saito, H., Matsuda, Y. and Glicksman, M.A. K252a derivatives for the treatment of neurological disorders. U.S. 5,621,100 (patent for compounds in CEP-1347 class).

Lewis, M.E., Kauer, J.C., Neff, N., Roberts-Lewis, J., Murakata, C., Saito, H., Matsuda, Y. and Glicksman, M.A. Protein kinase inhibitors for the treatment of neurological disorders. U.S. 5,621,101 (patent for compounds in CEP-1347 class).

Lewis, M.E., Apfel, S.C. and Kessler, J.A. Prevention and treatment of peripheral neuropathy. U.S. 5,633,228 (patent for Myotrophin - post-polio syndrome indication; preliminary Phase II study conducted).

Lewis, M.E., Apfel, S.C. and Kessler, J.A. Prevention and treatment of peripheral neuropathy. U.S. 5,648,335 (patent for Myotrophin - hereditary neuropathy indications).

Lewis, M.E., Kauer, J.C., Smith, K.R., Callison, K.V. and Baldino, F., Jr. Treating disorders by application of insulin-like growth factor. U.S. 5,652,214 (patent for Myotrophin - broad central neurological indications, with dose range limits).

Lewis, M.E., Kauer, J.C., Smith, K.R., Callison, K.V., Baldino, F., Jr., Neff, N. and Iqbal, M. Treating disorders by application of insulin-like growth factor. U.S. 5,703,045 (patent for IGF-II - broad central neurological indications).

Lewis, M.E., Kauer, J.C., Neff, N., Roberts-Lewis, J., Murakata, C., Saito, H., Matsuda, Y., Glicksman, M.A., Kanai, F. and Kaneko, M. Protein kinase inhibitors for the treatment of neurological disorders. U.S. 5,741,808 (patent for compounds in CEP-1347 class).

Lewis, M.E., Kauer, J.C., Neff, N., Roberts-Lewis, J., Murakata, C., Saito, H., Matsuda, Y., Glicksman, M.A., Kanai, F. and Kaneko, M. Protein kinase inhibitors for the treatment of neurological disorders. U.S. 5,756,494 (patent for compounds in CEP-1347 class).

Lewis, M.E., Kauer, J.C., Smith, K.R., Callison, K.V., Baldino, F., Jr., Neff, N. and Iqbal, M. Treating disorders by application of insulin-like growth factor. U.S. 5,776,897 (patent for Myotrophin - broad central neurological indications, without dose range limits).

#### PUBLISHED PATENT APPLICATIONS:

Lewis, M.E., Kauer, J.C., Smith, K., Callison, K.V. and Baldino, F., Jr. Treating disorders by application of insulin-like growth factors and analogs. WO 90/14838. Issued in Japan, Patent Pub. No. 68138/95.

Bozyczko-Coyne, D., Neff, N., Lewis, M. E., and Iqbal, M. Treating retinal neuronal disorders by the application of insulin-like growth factors and analogs. WO 93/08826.

Lewis, M.E., Kauer, J.C., Smith, K., Callison, K.V. and Baldino, F., Jr., Neff, N. and Iqbal, M. Treating disorders by application of insulin-like growth factors and analogs. WO 93/20836.

Lewis, M.E., Apfel, S.C. and Kessler, J.A. Prevention and treatment of peripheral neuropathy. WO 93/25219.

Lewis, M.E., Neff, N., Roberts-Lewis, J., Murakata, C., Saito, H., Matsuda, Y. and Kauer, J.C. Bis-staurosporine and K-252a derivatives. WO 94/02488.

Djakiew, D. and Lewis, M.E. A method for the detection and treatment of prostate disease. WO 94/06935.

Hoffman, E., Carswell, S. and Lewis, M.E. Method for identifying compounds that induce an increased level of the nerve growth factor mRNA. WO 94/19461.

Yaksh, T.L., Farrar, J.J., Maycock, A.L., Lewis, M.E. and Dow, G.J. Peripherally active

anti-hyperalgesic opiates. WO9709973-A2

## PUBLICATIONS:

Lewis, M.E. and Stein, D.G.: Pattern discrimination after lesions of the visual cortex (letter). Science, 190: 914-915, 1975

Isseroff, A., Leveton, L., Freeman, G., Lewis, M.E. and Stein, D.G.: Differences in the behavioral effects of single stage and serial lesions of the hippocampus. Exp. Neurol., 53: 339-354, 1976.

Lewis, M.E. and Lancione, R.L.: A mathematical model of recovery from brain damage. Brain Theory Newsletter, 1: 65-66, 1976.

Lewis, M.E., Lakshmanan, J., Nagaiah, K., MacDonnell, P.C. and Guroff, G.: Nerve growth factor increases activity of ornithine decarboxylase in rat brain. Proc. Natl. Acad. Sci. USA, 75: 1021-1023, 1978.

Lewis, M.E., Avrith, D.B. and Fitzsimons, J.T.: Short latency drinking and markedly increased Na appetite following intracerebral microinjection of NGF in the rat. Nature, 279: 440-442, 1979.

Lewis, M.E., Brown, R.M., Brownstein, M.J., Hart, T. and Stein, D.G.: Nerve growth factor: effects on d-amphetamine-induced activity and brain monoamines. Brain Res., 176: 297-310, 1979.

Sahgal, A., Iversen, S.D., Lewis, M.E. and Trimnell, L. Effects of ACTH on a conflict schedule in pigeons. Comm. Psychopharmacol., 3: 211-216, 1979.

Avrith, D.B., Lewis, M.E. and Fitzsimons, J.T.: Renin-like effects of NGF evaluated using renin-angiotensin antagonists. Nature, 285: 248-250, 1980.

Bjorklund, A., Dunnett, S.B., Stenevi, U., Lewis, M.E. and Iversen, S.D.: Reinnervation of the denervated neostriatum by substantia nigra transplants: functional consequences as revealed by pharmacological and sensorimotor testing. Brain Res., 199: 307-333, 1980.

Guroff, G., Montgomery, P., Tolson, N., Lewis, M.E. and End, D.: The induction of ornithine decarboxylase by renin-free nerve growth factor. Proc. Natl. Acad. Sci. USA, 77: 4607-4609, 1980.

Lewis, M.E., Avrith, D.B. and Fitzsimons, J.T.: Polydipsia after injections--a property of NGF or a contaminant? Reply. Nature, 284: 577, 1980.

LeRoith, D., Shiloach, J., Roth, J., Liotta, A.S., Krieger, D.T., Lewis, M.E. and Pert, C. B: Evolutionary origins of vertebrate hormones: Material very similar to adrenocorticotrophic hormone, beta-endorphin and dynorphin in protozoa. Trans. Ass. Am. Phys., 94: 52-60, 1981.

Lewis, M.E., Mishkin, M., Bragin, E., Brown, R.M., Pert, C.B. and Pert, A.: Opiate receptor gradients in monkey cerebral cortex: correspondence with sensory processing hierarchies. Science, 211: 1166-1169, 1981.

Lewis, M.E., Patel, J., Moon Edley, S. and Marangos, P.J.: Autoradiographic visualization of rat brain adenosine receptors using N<sub>6</sub>-cyclohexyl-[<sup>3</sup>H]adenosine. Eur. J. Pharmacol., 73: 109-110, 1981.

Khachaturian, H., Lewis, M.E. and Watson, S.J.: Immunocytochemical studies with antisera against leu-enkephalin and enkephalin-precursor fragment (BAM-22P) in the rat brain. Life Sciences, 31: 1879-1882, 1982.

Khachaturian, H., Watson, S.J., Lewis, M.E., Akil, H., Coy, D. and Goldstein, A.: Dynorphin immunocytochemistry in the rat central nervous system, Peptides, 3:941-954, 1982.

LeRoith, D., Liotta, A.S., Roth, J., Shiloach, J., Lewis, M.E., Pert, C.B. and Krieger, D.T.: Corticotropin and beta-endorphin-like materials are native to unicellular organisms. Proc. Natl. Acad. Sci. USA, 79: 2086-2090, 1982.

Lewis, M.E., Khachaturian, H. and Watson, S.J.: Visualization of opiate receptors and opioid peptides in sequential brain sections. Life Sciences, 31: 1347-1350, 1982.

Mishkin, M., Lewis, M.E. and Ungerleider, L.G.: Equivalence of parietopreoccipital subareas for visuospatial ability in monkeys. Behav. Brain Res., 6: 41-55, 1982.

Smith, C.C., Lewis, M.E. and Tallman, J.F.: Effect of benzodiazepines on cyclic GMP formation in rat cerebellar slices. Pharmacol. Biochem. Behav., 16: 29-33, 1982.

Beinfeld, M.C., Lewis, M.E., Eiden, L.E., Nilaver, G., Pert, C.B. and Pert, A.: The distribution of cholecystikinin and vasoactive intestinal peptide in rhesus monkey brain as determined by radioimmunoassay. Neuropeptides, 3: 337-344, 1983.

Khachaturian, H., Lewis, M.E., Holtt, V. and Watson, S.J.: Telencephalic enkephalinergic systems in the rat brain, J. Neurosci., 3: 844-855, 1983.

Khachaturian, H., Lewis, M.E. and Watson, S.J.: Enkephalin systems in diencephalon and brain stem of the rat. J. Comp. Neurol., 220: 310-320, 1983.

Lewis, M.E., Khachaturian, H. and Watson, S.J.: Comparative distribution of opiate receptors and three opioid peptide neuronal systems in rhesus monkey central nervous system. Life Sciences, 33: 239-242, 1983.

Lewis, M.E., Pert, A., Pert, C.B. and Herkenham, M.: Opiate receptor localization in rat cerebral cortex. J. Comp. Neurol., 216: 339-358, 1983.

Khachaturian, H., Lewis, M.E. and Watson, S.J.: Colocalization of proenkephalin peptides in the same neurons in rat brain. Brain Res., 279: 369-373, 1983.

Khachaturian, H., Lewis, M.E., Akil, H. and Watson, S.J.: Proopiomelanocortin peptide immunocytochemistry in rhesus monkey brain. Brain Res. Bull., 13: 785-800, 1984.

Lewis, J. W., Lewis, M.E., Loomus, D.J. and Akil, H.: Acute systemic administration of morphine selectively increases mu opioid receptor binding in the rat brain. Neuropeptides, 5: 117-120, 1984.

Lewis, M.E., Khachaturian, H., Akil, H. and Watson, S.J.: Anatomical relationship between opioid peptides and receptors in rhesus monkey brain. Brain Res. Bull., 13: 801-812, 1984.

Lewis, M.E., Young, E.A., Akil, H., Houghten, R. and Watson, S.J.: Binding of [<sup>3</sup>H]dynorphin A to apparent kappa opioid receptors in deep layers of guinea pig cerebral cortex. Eur. J. Pharmacol., 98: 149-150, 1984.

Dores, R.M., Lewis, M.E., Khachaturian, H., Watson, S.J. and Akil, H.: Analysis of opioid and non-opioid end products of prodynorphin in the substantia nigra of the rat. Neuropeptides, 5: 501-504, 1985.

Khachaturian, H., Alessi, N.E., Lewis, M.E., Munfakh, N., Fitzsimmons, M. D. and Watson, S.J.: Development of hypothalamic opioid neurons: A combined immunocytochemical and <sup>3</sup>H-thymidine autoradiographic study. Neuropeptides, 5: 477-480, 1985.

Khachaturian, H., Lewis, M.E., Alessi, N.E. and Watson, S.J.: Time of genesis of opioid peptide containing neurons in the rat hypothalamus J. Comp. Neurol., 236: 538-546, 1985.

Khachaturian, H., Lewis, M.E., Haber, S. N., Akil, H. and Watson, S.J.: Prodynorphin peptide immunocytochemistry in rhesus monkey brain. Peptides, 6 (Suppl. 2), 155-166, 1985.

Khachaturian, H., Lewis, M.E., Schafer, M. K.-H. and Watson, S.J.: Anatomy of the CNS opioid systems. Trends in Neurosciences, 8: 111-119, 1985.

Lewis, M.E., Khachaturian, H. and Watson, S.J.: Combined autoradiographic-immunocytochemical analysis of opiate receptors and opioid peptide neuronal systems in brain. Peptides, 6 (Suppl. 1), 37-47, 1985.

Lewis, M.E., Sherman, T. G. and Watson, S.J.: In situ hybridization histochemistry with synthetic oligonucleotides: Strategies and methods. Peptides, 6 (Suppl. 2), 75-87, 1985.

Thomas, S. R., Lewis, M.E. and Iversen, S.D.: Correlation of [<sup>3</sup>H]diazepam binding density with anxiolytic locus in the amygdaloid complex of the rat. Brain Res., 342: 85-90, 1985.

Lewis, M.E., Arentzen, R. and Baldino, F., Jr.: Rapid, high-resolution in situ hybridization histochemistry with radioiodinated synthetic oligonucleotides. J. Neurosci. Res., 16: 117-124, 1986.

Lewis, M.E., Sherman, T.G., Burke, S., Akil, H., Davis, L.G., Arentzen, R., and Watson, S.J.: Detection of proopiomelanocortin mRNA by in situ hybridization

with an oligonucleotide probe. Proc. Natl. Acad. Sci. USA, 83: 5419-5423, 1986.

Mansour, A., Lewis, M.E., Khachaturian, H., Akil, H., and Watson, S.J.: Pharmacological and anatomical evidence of selective mu, delta, and kappa opioid receptor binding in rat brain. Brain Res., 399: 69-79, 1986.

Mansour, A., Lewis, M.E., Khachaturian, H., Akil, H., and Watson, S.J.: Multiple opioid receptor subtypes in the pituitary-adrenal axis: A cross-species study. NIDA Res. Monogr., 75: 311-314, 1986.

Young, E.A., Walker, J.M., Lewis, M.E., Houghten, R., Woods, J.H., and Akil, H.: [<sup>3</sup>H]Dynorphin A binding and kappa selectivity of prodynorphin peptides in rat, guinea pig and monkey brain. Eur. J. Pharmacol. 121: 355-365, 1986.

Mansour, A., Khachaturian, H., Lewis, M.E., Akil, H., and Watson, S.J.: Autoradiographic differentiation of mu, delta, and kappa opioid receptors in the rat forebrain and midbrain. J. Neurosci., 7: 2445-2464, 1987.

Rogers, W.T., Schwaber, J.S., and Lewis, M.E. Quantitation of cellular resolution in situ hybridization histochemistry in brain by image analysis. Neurosci. Lett., 82: 315-320, 1987.

Mansour, A., Khachaturian, H., Lewis, M.E., Akil, H., and Watson, S.J. Anatomy of the CNS opioid receptors. Trends in Neurosci., 11: 308-314, 1988.

Fitzpatrick-McElligott, S., Card, J. P., Lewis, M.E., and Baldino, F., Jr. Neuronal localization of prosomatostatin mRNA in rat brain with in situ hybridization histochemistry. J. Comp. Neurol., 273: 558-572, 1988.

Lewis, M.E., Krause, R.G. and Roberts-Lewis, J.M. Recent developments in the use of synthetic oligonucleotides for in situ hybridization histochemistry. Synapse, 2: 308-316, 1988.

Baldino, F., Jr., Deutch, A.Y., Roth, R.H., and Lewis, M.E. In situ hybridization histochemistry of tyrosine hydroxylase messenger RNA in rat brain. Ann. N.Y. Acad. Sci., 537: 484-487, 1988.

Ingram, S.M., Krause, R.G., Baldino, F., Jr., Skeen, L.C. and Lewis, M.E., Neuronal localization of cholecystokinin mRNA in the rat brain by using in situ hybridization histochemistry. J. Comp. Neurol., 287:260-272, 1989.

Lewis, M.E., Robbins, E., Grega, D. and Baldino, F., Jr., Nonradioactive detection of vasopressin and somatostatin mRNA with digoxigenin-labeled oligonucleotide probes. Ann. N.Y. Acad. Sci., 579: 246-253, 1990.

Roberts-Lewis, J.M., Cimino, M., Krause, R.G., Tyrrell, D.F., Davis, L.G., Weiss, B. and Lewis, M.E. Anatomical localization of calmodulin mRNA in the rat brain with cloned cDNA and synthetic oligonucleotide probes. Synapse, 5: 247-254, 1990.

Springer, J.E., Robbins, E., Meyer, S., Baldino, F., Jr. and Lewis, M.E. Localization of nerve growth factor receptor mRNA in the rat basal forebrain with

in situ hybridization histochemistry. Cell. Mol. Neurobiol., 10: 33-39, 1990.

Springer, J.E., Robbins, E., Gwag, B.J., Lewis, M.E. and Baldino, F., Jr. Non-radioactive detection of nerve growth factor receptor mRNA in the rat brain using in situ hybridization histochemistry. J. Histochem. Cytochem., 39: 231-234, 1991.

Liu-Chen, L.-Y., Li, S., and Lewis, M.E. Autoradiographic study of irreversible binding of [<sup>3</sup>H]beta-funaltrexamine to opioid receptors in the rat forebrain - comparison with mu-receptor and delta-receptor. Brain Res., 544: 235-242, 1991.

Robbins, E., Baldino, F., Jr., Roberts-Lewis, J.M., Meyer, S., Grega, D.S., and Lewis, M.E. Quantitative non-radioactive in situ hybridization of preproenkephalin mRNA with digoxigenin-labeled cRNA probes. Anat. Rec., 231: 559-562, 1991.

Carswell, S., Hoffman, E.K., Clopton-Hartpence, K., Wilcox, H.M., and Lewis, M.E. Induction of NGF by isoproterenol, 4-methyl catechol and serum occurs by three distinct mechanisms. Mol. Brain Res., 15, 145-150, 1992.

Robbins, E., Baldino, F., Jr., Roberts-Lewis, J.M., Reilly, E.M., and Lewis, M.E. Enzyme histochemical detection of specific neuronal mRNAs in brain. Cell Physiol. Biochem., 3, 173-180, 1993.

Apfel, S.C., Arezzo, J.C., Lewis, M.E. and Kessler, J.A. The use of IGF-I in the prevention of vincristine neuropathy in mice. Ann N.Y. Acad. Sci., 692, 243-245, 1993.

Lewis, M.E., Vaught, J.L., Neff, N., Grebow, P.E., Callison, K.V., Yu, E. and Baldino, F., Jr. The potential of IGF-I as a therapeutic for the treatment of neuromuscular disorders. Ann. N.Y. Acad. Sci., 692, 201-208, 1993.

Glicksman, M.A., Prantner, J.E., Meyer, J.L., Forbes, M.E., Dasgupta, M., Lewis, M.E. and Neff, N. K252a and staurosporin promote choline acetyltransferase activity in rat spinal cord cultures, J. Neurochem., 61, 210-221, 1993.

Roberts-Lewis, J.M., Marcy, V.R., Zhao, Y., Siman, R., Vaught, J.L. and Lewis, M.E. Aurintricarboxylic acid protects hippocampal neurons from NMDA- and ischemia-induced toxicity in vivo. J. Neurochem., 61, 378-381, 1993.

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